MACROECONMIC TENDENCIES OF ENVIRONMENTAL TAXES IN ROMANIA COMPARED TO EU-27 MEMBER STATES

Cristea Anca[16]

Abstract

Reforms of environmental taxes in EU member states began to consolidate a strategic conceptual basis since the early '90s, when it was launched the idea of changing the tax burden from the tax factor of production, work to the environmental factors and use of environmental unfriendly activities and goods. The theoretical support of this view is represented by the corrective taxes Pigou situation justifying the optimal level of activity of producing goods and services from a social perspective, the collection of taxes imposed by the state of polluters, depending on the amount of damage and damage to third parties, the principle of "polluter pays". Despite the green fees start reforms of the EU member countries and their levels are not increased in recent years as a share of GDP. In the EU-27, 2008, revenues from environmental taxes represented a rate of about 2.8% of GDP and 6.1% of total revenues compared to 2.9% and 7.0% record share of GDP in 1999.

Effects of environmental taxes on eco-efficiency must be seen not only in terms of their size or budget as income tax to GDP ratio, but also as a positive economic and social impact generated by larger beneficial effects of reducing pollution and preserving the quality natural resources and environmental factors.

Keywords:envoironmental taxes, eco-eficiency, green fees, corrective taxes Pigou.

Despite the difficulties in identifying and measuring negative externalities, this belief is gaining more and more support on account of the aggravation of the effects of climate changes.

Created in 1993, under the supervision of Jacques Delors, the White Paper on the Growth, Competitiveness and Employment in the European Union emphasizes the need for fiscal reform in Member States as an attractive political option for the decision-making factors of that time, considering that such a reform would lead to growth, employment and competitiveness in the countries in question by ensuring superior quality and practice of the natural capital, in agreement with the requirements of sustainable development. Several countries, including Denmark, Finland, Germany, the Netherlands and England have initiated, throughout the past decade, green tax reformation by increasing environmental taxes and using additional tax revenue to finance the reduction of fiscality on personal and occupational income, with the clear purpose of supporting employment growth. At the same time, these countries have adopted measures such as reducing tax rates or refinancing schemes to protect producers from the negative effects on competitiveness brought about by the increase of input costs. A similar policy was

[16] Ph.D. Lecteurer al Ecological University from Bucharest- The Faculty of Economic Scienses

adopted by the new EU members (Slovenia), where the carbon dioxide tax has been levied since 1997 on all energy-consuming products. The Czech Republic started the green tax reform in 2008 by increasing the tax rate for the majority of energy-intensive products. The resulting tax revenue from 2008 to 2012 was used to support public policies of employment growth.
However, despite the green fees reform start in EU member countries, tax revenue have not increased in recent years as GDP share. In the EU-27, in 2008, environment tax revenue represented only approximately 2.8% of GDP and 6.1% of total revenue, compared to 2.9% and 7% record share of GDP in 1999(See Table 2). The descending tendency of the share of environment tax revenue was encountered in the vast majority of EU member countries, with notable differences between these countries. Thus, beginning with 1995, an ascending trend in revenue can be seen in Denmark, Estonia, Latvia, Lithuania, the Netherlands, Austria, Poland and Slovakia, while in the remaining countries one can notice a quasi -constancy or diminution of the indicator value.

1.1.Environmental tax revenue – level and tendency in Romania compared to EU-27 members

The value of environmental taxes between 1995 and 2008, an analysis meant to emphasize the particularities, level and dynamics of environmental fiscality, short, medium and long-run.

Table 1 Comparative analysis of the average level*) of environmental tax share of GDP in Romania and EU Member States in sub-periods: 1995-2000, 2001-2006 and 2007-2008

(%)

	Sub-periods		
	1995-2000	**2001-2006**	**2007-2008**
România	2,9	2,2	1,95
EU-27	2,9	2,8	2,65
EU-25	2,9	2,8	2,65
EU-16 Euro Zona	2,95	2,76	2,55

x) average revenue

***Source*:** own calculations based on EUROSTAT data

In EU-27, the descending tendency of the share of environmental tax revenue was initiated in countries with an important role in the community economy, such as France, Italy and England.
The increase of the indicator value in new EU Member States was mostly generated by the demands of the process of joining the Union, even though some of these countries have used the opportunity to increase energy tax levels, even beyond community regulations.
In EU Member States pollution taxes are charged per physical consumption unit and are usually set in nominal terms, which explains their relative decline towards the end of the period under analysis.
As opposed to *ad-valorem* taxes, environmental taxes on consumer units have shown a decreasing tendency, as share of the GDP, without being adjusted to the inflation rate or increased regularly after different periods of time.

The main reasons for the gradual decrease of the actual value of environmental tax were as follows:

-The demand for energy grew more slowly than revenue, which entailed a decrease in the share of paid energy taxes when the economy underwent a growth process;

-The increase in energy taxes has probably led to the reduction of energy consumption, which subsequently affected the energy taxation basis, even though there was no reduction of energy expenses;

-Governments were not willing to constantly increase taxes on products that affect energy costs in both households and industries;

-From 1992 to 2004, the minimum EU rates on mineral oils remained at the same level until the Energy Tax Directive (2003/96/EC) was applied, so there was no justification for green tax rates to grow.

-On the other hand, the enticing growth of the commercialization of pollution permits and the high petrol prices in the early 2000s was another factor that contributed to the lack of extra environmental taxes, especially in what energy is concerned.

As for Romania, the figures in Table 2 point out the following tendencies:

-The level of environmental tax revenue as share of GDP until 1996 was lower than the EU-27 average;

-There was an increase from 1997 to 2000, followed by a tendency of continual decrease from 2001 to 2008;

-In 2008 Romania had one of the lowest GDP rates for environmental taxes, 1.8%, compared to 5.7 % in Denmark, 3.9 % in the Netherlands and 2.7 % in Finland;

-The annual GDP rate of green tax revenue was more oscillating in Romania than other EU countries.

-Environmental tax structure

Most of the environmental taxes come from the energy field (1.4% out of a total of 1.8 % in 2008, especially from taxation of petrol used in transports – 1.1%). The rest comes from taxation of transport (except for that based on petrol), as well as from pollution or resource taxes.

With a total of € 2.5 billion in 2008, Romania's environmental tax revenue ranks 25th in the EU hierarchy, with one of the lowest levels of the kind.

Energy taxes are by far the most significant category of environmental taxes, representing over 75% of total taxes and 5 % of overall taxes and social contributions at the EU-27 level.

The lowest environmental tax level (5%) is that of resources and pollution taxes. In most EU-27 countries the share of environmental taxes is between 2 and 3% of GDP or more.

The reduction of environmental tax share in Romania, in the last years of the period under analysis, was due to a significant growth of energy tax revenue.

The highest percentage of taxes on fuel used in transport (90%) can be found in the new EU Member States. For the older EU members, fuel tax revenue varies from 90% of total taxes (Ireland, Greece, Portugal and England) to approximately 50% in Denmark and Sweden.

These differences can be accounted for by the discrepancy in revenue from electricity and natural gas taxes, differences which persist among countries in spite of several attempts to reduce them by introducing new rates of minimum taxation on energy intensive products and electricity, such as the fore-mentioned Energy Tax Directive (2003/95/EC).
These differences originate from the options that EU Member States make in terms of environmental taxes and fees. For instance, in Denmark, the electricity consumption tax in non-industrial sectors is 80 times higher than the minimum taxation rate, while in Sweden it is about 30 times higher. As far as the fuel tax is concerned (in both transport and non-transport sectors) the differences between older and newer EU members are lower, compared to the overall energy taxation.
The high rate of taxes on fuels used in transport, heating and business shows that the choice of minimum taxation rate was not influenced only by ambient factors. From this point of view alone, even taxation of polluting substances would be preferable. Nevertheless, for social reasons, lower tax rates can be applied on building heating, for instance. On the other hand, high taxes on fuels are also justified by high marginal costs in the transport sector generated by factors such as accidents, jams(crowds), noise, as well as the need to finance infrastructure.
Therefore, I would like to emphasize the fact that the effects of environmental taxes on eco-efficiency must be seen not only in terms of their size or budget as income tax to GDP ratio, but also as a positive economic and social impact generated by larger beneficial effects of reducing pollution and preserving the quality of natural resources and environmental factors.
A complex approach on these effects entails thorough studies on the positive and negative externalities of production and consumption of public and private goods and service throughout their entire lifespan, from conception and design to final consumption.
The energy consumption tax – final energy consumption ratio is another formula of eco-efficiency which, instead of GDP or production, uses as numerator the overall amount of energy taxes. In other words, a higher value indicates that the environment protection and population health policy is more aggressive, on the one hand by means of efficient use of available energy resources and, on the other hand, by reducing pollution in various ways, especially GES.
The indicator of energy tax revenue in relation to the final energy consumption in Romania, as opposed to other countries (see Table 5) underlines the following important aspects:

a) all countries under analysis, from 1995 to 2008, have shown a **significant growth** of the indicator, especially in the beginning, which confirms the multiplication of the number of environmental taxes and /or the increase of the level of existing ones, to which the growth of energy costs has had an important contribution;

b) throughout this period, **Romania has had the lowest leve**l of environmental tax on energy as opposed to the final energy consumption, which shows a relatively low contribution of these taxes to the implementation of environment investments and ecological reconstruction, hence the necessity of improved absorption of structural funds and cohesion to EU;

c) in developed EU Member States the indicator was considerably higher than in new EU members with emerging economies, which brings out important discrepancies

between the two groups of countries in terms of policies, instruments and mechanisms, as well as of financing abilities and eco-efficiency;
d) from 2000 to 2008, the analyzed indicator increased less compared to 19995-2000, which stands as proof of the fact that its marginal growth is more and more reduced, reaching the so-called **theoretical thresholds of "optimality"** of fiscality or "maximum" limits beyond which no tax increase will generate a corresponding growth of budget revenue, which confirms the "postulates" of the Laffer Curve;
e) the evolution of the indicator in Romania, throughout the entire period under analysis, has had a general growth tendency, given the smaller or bigger oscillations from year to year;
f) the same general growth tendency was seen in the other countries as well, except for the fact that the levels of the indicator were more than twice as high compared to Romania's level.
g) The indicator of energy tax revenue in relation to the final energy consumption has a similar significance to the previously analyzed indicator, except that, on account of the higher values of energy consumption as denominator, the ratio was no so high. Furthermore, the denominator used deflating values of the tax revenue, which entailed growth reductions in the numerator, as a result of the inflation of consumer price index.
h) The calculation of the indicator in Table 3, given the application of the final demand deflator (2000=100) confirms the conclusions drawn from our own calculations regarding the indicator level in Romania, as compared to other countries. Unlike previous conclusions, calculations of comparable prices show less significant dynamics in Romania, as well as in the other countries, as there were relatively long periods when its oscillations, from one year to the next, have failed to emphasize the obvious decrease or increase tendencies, as with the first indicator.

1.2Energy efficiency

The calculation of the energy efficiency E_{fen} was done using the formula:

$$E\,fen = \frac{GDP}{K_{gpe}}$$

where:
GDP = gross domestic product in €; K_{gpe} = kilo petrol equivalent

As one can see, the E_{fen} indicator has a mixed character, as it relates a value indicator to a physical one, unlike other indicators which use only monetary values for both numerator and denominator.

The figures in Table 6 show that in 2008 Romania had a value of E_{fen} which was several times lower (€1.62/ K_{gpe}) than the EU-27 average which was €4.99/ K_{gpe}.

The relevance of the E_{fen} indicator at the macroeconomic level, but also at the micro and mezzo level, refers primarily to financial-economical, environmental and social achievements of entities under analysis. To be more precise, the indicator shows, by comparison in an international and inter- sectorial context, the level of social and economic development of a country, its capacity to generate bigger or smaller value added to the consumption of one physical unit of 1 kilo petrol equivalent.

The most important factors that affect the value of E_{fen} include the level of the technologies used and their capacity to be upgraded to the latest results of research, development and innovation activities that take place in their own countries, as well as in other states. On the other hand, the complexity of the national economic structure, which is given by **the share** of sectors, branches and activities **with the highest levels of added value**, in internal and international value chains, is yet another factor that can have a positive impact on the size of the indicator which shows the capacity "doing more with less."

The highest E_{fen} values were found in Switzerland and Japan, with more than €10 / K_{gpe}, which is more than five times higher than Romania's.

The analysis of long-term tendency (1970-2008) of the E_{fen} indicator is becoming more and more widely used as a means of ascertaining the extent to which national economies have sustainable development and transition to low carbon economy or green economy. An increase of the long-term E_{fen} values translates into improved macroeconomic energy efficiency.

An issue for future research is whether the growth of energy efficiency, as key indicator of eco-efficiency, is sufficient for environmental and ecological balance mitigation. Research in this field has shown that for many countries, especially those with a low E_{fen} level, it cannot be considered that the needs for sustainability are met.

In what the long -term evolution of the E_{fen} is concerned, all countries under analysis have shown a growth tendency, which proves that the dynamics of GDP is superior to that of energy consumption. This obviously does not mean doing more with less! Nevertheless, this tendency represents one of the possible eco-efficiency growth scenarios, without being the best scenario that entails an increase in products and services whilst reducing energy consumption or maintaining it at a constant level.

The problem that arises is the extent to which this level of consumption, which is growing, will be sustainable over a long period of time. Romania's unfavorable position in relation to the E_{fen} indicator shows several problems that our country is facing, such as:

-The existence of an energy-intensive economy;

-Low productivity and efficiency of the technologies being used;

-Poor use of mechanisms and instruments pertaining to the real and monetary economy towards overall productivity efficacy;

-Poor ability to adapt to new tendencies regarding the best eco-friendly available technologies;

-Table 6 compares the level of energy efficiency in Romania (=1) and other countries, from 1995 to 2008, in order to provide **an overview of the disparities** between Romania and other countries, as well as **the tendencies of these disparities**, short, medium and long run.

-Unfortunately, the evolution of the discrepancies between Romania and other EU-27 countries, especially those with a relatively high level of economic development, underwent an increasing trend between 1995 and 2008. Romania's unfavorable situation should be thoroughly considered particularly by decision-makers in the real economy, as well as by those dealing with energy in the research, development and innovation fields, so as to find solutions that can counterbalance this long –run tendency of disparity growth between Romania and other countries. Only by reducing these gaps can we take into consideration the position of Romanian economy on **a real convergent trajectory**. The

biggest gap in the E_{fen} indicator was in relation to Germany whose level was six times higher than Romania's in 2005. This growth tendency of the discrepancies between Romania and developed countries regarding the long-term E_{fen} indicator decelerated, showing even a slight reduction starting with 2004.

-It is worth mentioning that several countries with emerging economies (Slovakia, Slovenia and the Czech Republic) have managed to reduce the gaps in relation to other countries, which is not the case with Romania.

-The conclusion is that the E_{fen} analysis and calculations show that, given the impact of the current economic and financial crisis, the energy efficiency gaps between developed and under-developed countries have enlarged, as the reduction of production was significantly higher than in developed countries, while the shock-resistance capacity was slightly lower.

Table 2 Environmental tax revenue in EU-27, from 1995 to 2008, % of GDP

															Diferente	
	1995	**1996**	**1997**	**1998**	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**1995-2008**	**2000-2008**
România	**1.9**	**1.8**	**2.8**	**3**	**3.9**	**3.4**	**2.4**	**2.1**	**2.4**	**2.4**	**2**	**1.9**	**2.1**	**1.8**	**-0.1**	**-1.7**
E-27 average																
- Weighted	0	0	0	2.8	2.9	2.7	2.7	2.7	2.7	2.7	2.6	2.5	2.5	2.4	0	-0.3
- Arithmetic	0	0	0	2.9	3	2.8	2.8	2.7	2.8	2.9	2.8	2.7	2.7	2.6	0	-0.2

***Source*:** Commission Services, Taxation Trends in the European Union, EUROSTAT, 2010 edition.

Table3. The ratio between energy tax and final energy consumption - Revenues

(€/oil ton deflated by the percentage cumulative change in the final demand deflator (2000=100)

															Diferente	
	1995	**1996**	**1997**	**1998**	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**1995-2008**	**2000-2008**
România	**160.2**	**98.4**	**77.1**	**77.2**	**79**	**58.2**	**27.9**	**22.3**	**22.1**	**23**	**24.7**	**26.2**	**32.2**	**26.2**	**-134**	**-32**
EU-27 average																
- Weighted	0	0	0	177.7	189	188.8	182.5	187.7	184.5	182.8	177.4	175.8	174.9	166.4	0	-22.5
- Arithmetic	0	0	0	123.8	127.6	121.8	122.6	126.2	127.4	129.6	129.8	129.1	133.6	129.2	0	7.4

***Source*:** Commission services, EUROSTAT, 2010.

Tabelul Table 4. The value of the E_{fen} indicator (energy efficiency) at the macroeconomic level compared to other countries, from 1990 to 2008 (€/Kgpe)

(€/Kgep)

geo\time	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
EU-27	:	:	:	:	:	4.79	4.71	4.89	4.99	5.17	5.33	5.32	5.40	5.34	5.41	5.51	5.69	5.91	5.98
EU-15	:	4.63	4.73	4.72	4.83	5.51	5.40	5.58	5.63	5.80	5.96	5.94	6.03	5.97	6.03	6.14	6.35	6.59	6.66
ROMÂNIA	**-**	**0.78**	**0.81**	**0.83**	**0.91**	**0.91**	**0.92**	**0.92**	**0.96**	**1.07**	**1.09**	**1.16**	**1.17**	**1.18**	**1.30**	**1.36**	**1.42**	**1.52**	**1.62**
USA	3.99	3.95	4.01	4.05	4.14	4.19	4.25	4.39	4.54	4.63	4.69	4.84	4.88	4.98	5.03	5.17	5.36	5.38	5.53
JAPAN	10.13	10.35	10.20	10.15	9.68	9.60	9.64	9.68	9.65	9.47	9.62	9.80	9.81	10.04	9.99	10.22	10.54	10.87	11.09

Source: Own calculations based on primary Eurostat data.

Table 5. The structure of environmental taxes in Romania, into origin and categories, from 200 to 20008, compared to EU-27

% of GDP

Tax category	years									2008	
	2000	2001	2002	2003	2004	2005	2006	2007	2008	Poziție in UE 27	Mld.€
Environmental taxes Total, of which:	3,4	2,4	2,1	2,4	2,4	2,0	1,9	2,1	1,8	25	2,5
• Energy, of which:	3,2	1,9	1,7	2,0	2,1	1,8	1,7	1,7	1,4	23	2,0
- tax on transport fuel	...	...	...	...	...	...	...	1,3	1,1	23	...
• Transport (other than fuel)	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,3	0,4	17	0,5
• Pollution/ resources	0,1	0,4	0,3	0,3	0,2	0,1	0,1	0,0	0,0	22	0,0
Indirect taxes– total, of which:	12,2	11,3	11,6	12,3	11,7	12,9	12,8	12,6	12,0	22	16,7
• VAT	6,5	6,2	7,1	7,2	6,7	8,1	7,9	8,1	7,9	12	12,0
• Excise	3,0	2,8	2,6	3,5	3,6	3,3	3,2	3,0	2,7	17	3,8
Direct taxes – Total, of which:	7,0	6,4	5,8	6,0	6,4	5,3	6,0	6,7	6,7	26	9,4
• Personal income	3,5	3,3	2,7	2,8	2,9	2,3	2,8	3,3	3,4	25	4,7
• Corporation revenue	3,0	2,5	2,6	2,8	3,2	2,7	2,8	3,1	3,0	15	4,2
• Social contributions	11,1	10,9	10,7	9,4	9,1	9,6	9,7	9,7	9,3	19	13
- of employers	8,1	7,1	6,5	6,2	5,9	6,4	6,3	6,2	6,0	15	8,4
- of employees	5,2	5,7	5,9	4,9	4,8	4,6	5,2	5,6	5,4	24	7,6
Structure of economic functions											
-Consumption	11,5	10,6	10,9	11,5	11,1	12,3	12,1	11,8	11,2	16	15,9
-Work	13,2	12,8	12,3	11,1	10,7	11,0	11,5	11,8	11,5	23	16,2

• Employment- tota,. of which:	13,2	12,8	12,3	11,1	10,7	11,0	11,5	11,8	11,5	23	16,1
-paid by employer	8,1	7,1	6,5	6,2	5,9	6,4	6,3	6,2	6,0	17	8,4
-paid by employee	5,2	5,7	5,9	4,9	4,8	4,6	5,2	5,6	5,4	24	7,6
-Capital	5,5	5,1	4,8	5,0	5,4	4,5	4,9	5,4	5,2	22	7,3
• Capital and business revenue	4,3	3,9	3,8	4,0	4,5	3,6	3,9	4,2	4,2	22	5,9
• Corporation revenue	3,0	2,7	2,6	2,8	3,2	2,7	2,8	3,1	3,0	15	4,2
• Household revenue	1,2	1,1	1,0	0,9	1,0	0,6	0,7	0,8	0,9	12	1,2

Source: Eurostat and own calculations

Table 6 **Comparison between energy efficiency of other countries and that of Romania (= 1,00) from 1995 to 2008**

	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2
Romania	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	
Belgium	0.52	0.70	1.38	1.54	1.89	2.35	3.40	4.08	4.47	4.50	3.75	3.39	3.50	
Bulgaria	0.00	0.00	0.00	0.48	0.68	0.85	1.37	1.52	1.70	1.76	1.37	1.23	1.25	
Czech Republic	0.20	0.34	0.69	0.79	1.01	1.24	2.13	2.81	3.01	3.16	2.79	2.77	2.84	
Germany	0.89	1.29	2.50	2.82	3.85	4.70	6.84	7.86	8.90	8.89	6.66	6.10	6.05	
Greece	0.79	1.16	2.13	2.05	2.58	2.98	3.95	4.29	5.04	5.11	3.85	3.49	3.33	
Spain	0.79	1.25	2.43	2.52	3.24	3.66	5.36	6.00	6.72	6.51	5.06	4.57	4.27	
France	0.75	1.13	2.32	2.50	3.30	4.05	6.01	6.58	7.55	7.33	5.72	5.14	4.77	
Italy	0.92	1.54	3.12	3.24	3.97	4.69	6.73	7.60	8.49	7.96	6.21	5.64	5.03	
Hungary	0.45	0.54	1.08	1.08	1.32	1.56	2.38	2.87	3.59	3.24	2.59	2.22	2.28	
Netherlands	0.41	0.58	1.27	1.42	1.94	2.32	3.53	4.02	4.72	4.53	3.77	3.50	3.05	
Austria	0.73	1.00	2.13	2.25	2.95	3.46	4.84	5.18	5.91	6.02	4.64	4.09	4.09	
Sweden	0.61	1.05	2.18	2.31	3.10	3.80	5.44	6.08	7.32	7.40	5.48	5.17	4.76	
United Kingdom	0.62	0.97	2.41	2.74	3.65	4.87	7.23	8.35	8.62	8.84	6.85	6.37	5.70	

Source: Own calculations based on primary Eurostat data.

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